

REMARKS

Claims 1 and 3-21 are active in the present application.

Applicants wish to thank Examiner Kornakov for the helpful discussion with the Applicants' undersigned representative on June 27, 2002.

The rejection of Claims 1, 4 and 6 under 35 U.S.C. §102 over EP 0 081 355 is obviated by amendment.

EP 0 081 355 discloses a method of cleaning and reclaiming printing screens using an ink cleaning composition containing N-methyl-2-pyrrolidone, an oxygenated solvent (e.g., butyl cellosolve and cyclohexanone), and a surfactant (see Abstract). EP 0 081 355 further discloses that “the NMP, oxygenated solvent and surfactant composition *must be non-aqueous*” (emphasis added, page 6, lines 23-24). The Examiner recognizes this limitation in EP 0 081 355 by stating “EP ‘355 does not disclose the presence of water in his disclosure, as per instant claims 2 and 3” (paper number 4, page 6, lines 5-6). Accordingly, the presently claimed invention cannot be anticipated by or rendered obvious in view of EP 0 081 355.

Applicants respectfully request withdrawal of this ground of rejection.

The rejection of Claims 2, 3 and 5 under 35 U.S.C. §103 over EP 0 081 355 in view of Griesshammer is obviated by amendment.

EP 0 081 355 is discussed above. Griesshammer discloses a process for cleaning polished semi-conductor discs by immersing the disc in a surfactant solution followed by rinsing with high purity water (column 2, lines 15-27). Griesshammer further discloses that the disc is rendered hydrophobic by treatment with an aqueous solution of a cationic surfactant (column 2, lines 28-38).

As stated above, the Examiner recognizes that EP 0 081 355 does not disclose the presence of water in his disclosure. In fact, EP 0 081 355 *teaches away* from adding water to their cleaning composition by stating that the composition “*must be non-aqueous*” (page 6, lines 23-24). Therefore, there can be no motivation to combine the disclosures of EP 0 081

355 and Griesshammer, and as such, the present invention would not be obvious in view of the combined disclosures of EP 0 081 355 and Griesshammer.

Applicants respectfully request withdrawal of this ground of rejection.

The rejection of Claims 1-6 under 35 U.S.C. §103 over Han et al in combination with EP 0 081 355 is obviated by amendment.

As discussed above EP 0 081 355 does not disclose or suggest the presently claimed composition. In particular, EP 0 081 355 *teaches away* from a composition containing water. Han et al disclose a composition for removing baked-on food residues from hard surfaces that contains a surfactant, a builder, an amine, *water*, and a solvent from a Markush group (column 1, line 63 to column 2, line 33).

The Examiner states the “Han does not provide specific ratios with all amounts of ingredients as instantly claimed, however does indicate all the components of a composition, including water” (paper number 4, page 8, lines 1-2). However, Applicants submit that this statement is incorrect. In the description of component (e), Han et al state that the formulation “further comprises from about 3 to 50% of *a solvent*, which solvent is selected from the groups consisting of i), ii), and iii)” (column 2, line 8-9). The only solvent in this list that may be a binary solvent system is group iii), the remaining groups contain a mere list of alternatives. Therefore, ethylene glycol monobutyl ether and N-methyl 2-pyrrolidone are alternatives in group ii) and not disclosed as suitable for use together (page 2, line 18-20). Further support for ethylene glycol monobutyl ether and N-methyl 2-pyrrolidone being alternatives only, and not desired to be present in the composition at the same time, can be found at column 9, lines 67-68, which states “3% to 20% solvent, which can be Butyl Cellosolve, Butyl Carbitol, *or* N-methyl 2-pyrrolidone.” Moreover, Han et al do not provide any example in which both solvents are present; in fact, Example D (column 10, lines 24-40) puts forth 6 compositions, which contain either ethylene glycol monobutyl ether *or* N-methyl 2-pyrrolidone. Accordingly, there would be no motivation based on the disclosure of Han et al.

al to make a composition containing *both* ethylene glycol monobutyl ether and N-methyl 2-pyrrolidone.

Applicants submit that EP 0 081 355 *teaches away* from adding water to their cleaning composition by stating that the composition “*must be non-aqueous*” (page 6, lines 23-24). Therefore, there is no motivation to combine the disclosure of EP 0 081 355 with the disclosure of Han et al, which requires water to be present. Accordingly, Applicants submit that the present invention would not be obvious.

Applicants respectfully request withdrawal of this ground of rejection.

The rejection of Claims 7-9 under 35 U.S.C. §103 over Griesshammer in view of EP 0 081 355 is obviated by amendment.

Griesshammer discloses a method for cleaning semiconductor discs in which the discs are first polished and then immersed in a surfactant cleaning solution (see Claim 1). As acknowledged by the Examiner, Griesshammer “does not disclose [the] all the specificities of cleaning composition wherein the surfactant is presented along such solvents as ethylene glycol monobutyl ether and N-methyl-2-pyrrolidone” (paper number 4, page 9, lines 1-3). Moreover, the Examiner recognizes that EP 0 081 355 does not disclose the presence of water in the cleaning composition in his disclosure. In fact, EP 0 081 355 *teaches away* from adding water to their cleaning composition by stating that the composition “*must be non-aqueous*” (page 6, lines 23-24). Therefore, no motivation exists to combine the disclosures of EP 0 081 355 and Griesshammer, and as such, the present invention would not be obvious in view of the combined disclosures of EP 0 081 355 and Griesshammer.

Newly added Claims 13-17 are neither anticipated by, nor obvious in view of, EP 0 081 355, Griesshammer, or Han et al, or any combination thereof.

Newly added Claim 13 provides a composition containing N-methyl-2-pyrrolidone, ethylene glycol monobutyl ether, and 0.1 to 1.0 wt% of a surfactant. Applicants have found that when the surfactant concentration is within this range the surface tension of the cleaning

solution is reduced (page 12, lines 10-15 and Figure 2). However, “if the content of the surfactant exceeds 1 wt%, dot-like “stains” remain on a substrate after cleaning” (page 12, lines 15-17).

EP 0 081 355 discloses a composition containing N-methyl-2-pyrrolidone, an oxygenated solvent (e.g., butyl cellosolve and cyclohexanone), and a surfactant (see Abstract). Citing Claim 9 and Example 1, the Examiner indicates that EP 0 081 355 discloses a surfactant concentration of about 1 to 5% (paper number 4, page 3, lines 18-20). However, Applicants submit that the disclosure “about” does not anticipate the presently claimed concentration range. Moreover, MPEP §2131.03 states:

When the prior art discloses a range which touches, overlaps or is within the claimed range, but no specific examples falling within the claimed range are disclosed, a case by case determination must be made as to anticipation. In order to anticipate the claims, the claimed subject matter must be disclosed in the reference with “sufficient specificity to constitute an anticipation under the statute.”

Applicants submit that EP 0 081 355 does not provide any examples, which fall within or touch the claimed range (EP 0 081 355 Example 1 uses 2.72 wt% surfactant and Example 2 uses 1.36 wt% (page 14, lines 5-22)). Accordingly, EP 0 081 355 fails to provide “sufficient specificity” to anticipate the claimed concentration range of the surfactant in new Claim 13.

The deficiency in EP 0 081 355 can not be overcome by Griesshammer or Han et al for the reasons set forth above. Therefore, new Claims 13-17 are neither anticipated by, nor obvious in view of, EP 0 081 355, Griesshammer, or Han et al, or any combination thereof.

The rejection of Claims 1-6 under 35 U.S.C. §112, second paragraph, is obviated by amendment.

The objection of Claims 10-12 under 37 C.F.R. §1.75(c) is traversed.

Applicants submit that the Preliminary Amendment filed on December 29, 2000 removed all multiple dependencies. Accordingly, this objection should be withdrawn.

Applicants submit that the present application is in condition for allowance. Early notification to this effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

Cancel Claim 2.

Please amend the claims as follows:

--1. (Amended) A [cleaning solution for removing a byproduct derived from a decomposed substance of a process gas containing C and F, and deposited on a component in a process chamber of a semiconductor processing apparatus for subjecting a target substrate to a semiconductor process with the process gas,

the cleaning solution containing] composition comprising N-methyl-2-pyrrolidone, ethylene glycol monobutyl ether, [and] a surfactant, and water [with an alkali metal content of less than 10 ppb].

[4] 3. (Amended) The [cleaning solution] composition according to claim [3] 1, wherein the water concentration is [contained at a content of] 5 to 20 wt%.

[5] 4. (Twice Amended) The [cleaning solution] composition according to claim 1, wherein the surfactant concentration is [contained at a content of] 0.1 to 1.0 wt%.

[6] 5. (Amended) The [cleaning solution] composition according to claim [5] 4, wherein the surfactant contains fluorine.

[7] 6. (Twice Amended) The [cleaning solution] composition according to claim 1, wherein a total content of the N-methyl-2-pyrrolidone and ethylene glycol monobutyl ether is 80 to 90 wt%, and a ratio of a content of the N-methyl-2-pyrrolidone to the total content of the N-methyl-2-pyrrolidone and ethylene glycol monobutyl ether is 0.75 to 0.95.

[8] 7. (Amended) A cleaning method for removing a byproduct derived from a decomposed substance of a process gas containing C and F, and deposited on a component in a process chamber of a semiconductor processing apparatus for subjecting a target substrate

to a semiconductor process with the process gas,

the method comprising [the steps of]:

removing the component from the process chamber; and

dipping the component in a bath of a cleaning solution [containing] comprising N-methyl-2-pyrrolidone, ethylene glycol monobutyl ether, [and] a surfactant, and water.

[9] 8. (Amended) The cleaning method according to claim [8] 7, wherein the component is dipped in the bath of the cleaning solution while the component is stored in a cage with 500 to 100 meshes.

[10] 9. (Twice Amended) The cleaning method according to claim [8] 7, wherein the component is dipped in the bath of the cleaning solution while a temperature of the cleaning solution is set at 50 to 80°C.

[11] 10. (Twice Amended) The cleaning method according to claim [8] 7, wherein the semiconductor process comprises etching a layer consisting essentially of a silicon oxide on the target substrate by using the process gas.

[12] 11. (Twice Amended) The cleaning method according to claim [8] 7, wherein the cleaning solution further contains an alkali metal [content is] concentration of less than 10 ppb.

[13] 12. (Twice Amended) The cleaning method according to claim [8] 7, wherein, in the cleaning solution, a total content of the N-methyl-2-pyrrolidone and ethylene glycol monobutyl ether is 80 to 90 wt%, and a ratio of a content of the N-methyl-2-pyrrolidone to the total content of the N-methyl-2-pyrrolidone and ethylene glycol monobutyl ether is 0.75 to 0.95--

--13. -- 21. (New)--